Supplementary Notes on Flounders from Japan with Remarks on the Species of Hippoglossoides.

By

Carl L. Hubbs, A.M.

Field Museum of Natural History, Chicago, U. S. A.

I.—Introduction.

Since the publication of the report on the "Flounders and Soles from Japan, collected by the United States Bureau of Fisheries steamer 'Albatross' in 1906,"[1] some additional facts[2] have come to light, and are added to the literature of ichthyology in the following notes. A discussion of the species *Hippoglossoides* is also presented.

II.—Japanese Flounders (other than Hippoglossoides).

Pseudorhombus misakius Jordan and Starks.

The characters separating this species from *P. arsius* are: the presence of a white bordered ocellus on the lateral line, more rays in the dorsal, and a deeper body; these statements through a clerical error were reversed by Hubbs (l.c., p. 463) in quoting Snyder.

Genus **Acanthopsetta** Schmidt.

Acanthopsetta in its technical characters is close to *Hippoglossina*, a genus from the eastern Pacific. The two genera, however, are of dissimilar habitus, and probably of independent origin.

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1) Hubbs, Proc. U.S. Nat. Mus., 48, 1915, pp. 449-496.

2) The additional records of flounders dredged by the Albatross are added with the permission of Dr. Hugh M. Smith, Commissioner of Fisheries, U.S.A.

Genus **Cleisthenes** Jordan and Starks.

The scales of *C. pinetorum* are less strongly ctenoid than in *C. hertzensteini*, despite the reverse statement,[1] due to a clerical error.

C. hertzensteini should further be recorded from *Albatross* station 4988, in the Gulf of Tartary.

Pleuronichthys cornutus (Temminck and Schlegel).

This species was also obtained at *Albatross* station 4888, in Eastern Sea.

Lepidopsetta mochigarei Snyder.

The recording[2] of this flounder from *Albatross* station 5067 in Suruga Gulf was an error, arising from incorrect tin tag labeling, discovered subsequently to the publication of the record. In addition to other localities, the species was obtained at *Albatross* station 5000 in the Gulf of Tartary.

Liopsetta glacialis Pallas.

On the basis of European material, this species has been divided into a robust and a slender form.[3] The Kamchatkan specimens previously recorded[4] belong to the robust type, whatever its systematic position may be.

Genus **Dexistes** Jordan and Starks.

Subgenus **Tanakius,** nov.

Subgenotype.—*Microstomus kitaharæ* Jordan and Starks.

Extremely similar to *Dexistes*, differing in the still more fragile body and in the increased number of vertebræ, fin-rays, and scales.

In the usual division of the genera of the Pleuronectinæ, *Dexistius*

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1) Hubbs, *l.c.*, p. 472.
2) Hubbs, *l.c.*, p. 477.
3) Smitt, Hist. Scandin. Fishes, 1, 1893.
4) Hubbs. *l.c.*; p. 487.

and *Tanakius* would be separated in the two primary subdivisions. The close relationship of the two groups, however, is quite evident, and is very well expressed by subgeneric distinction.

Each of the two subgenera contains a single Japanese species, and *Dexistes*, in correlation with its fewer vertebræ and associated characters, is the southern representative of *Tanakius*.

Tanakius: named in honor of Dr. Shigeho Tanaka, a distinguished Japanese zoologist.

Dexistes (**Tanakius**) **kitaharae** Jordan and Starks.

Microstomus kitaharæ Jordan and Starks, Bull. U. S. Fish. Comm., 22, 1902 (1904), p. 622, with plate; Proc. U. S. Nat. Mus., 31, 1906 (1907), p. 223; Hubbs, *ibid.*, 48, 1915, p. 490.

Microstomus hireguro Tanaka, Zool. Mag., 28, 1916, p. 67 (not seen); Fig. Desc. Fishes Jap., 25, 1917, p. 447, pl. 122, fig. 351.

Microstomus hireguro seems to be based upon a large individual of *Dexistes kitaharæ*, specimens of which were dredged by the *Albatross* near the type locality of the nominal species.

The marked differences between this species and *Microstomus stelleri*[1] are really of generic value, and their relationship is quite distant. In addition to these differences, the teeth in *Dexistes* are more numerous, and occur on both sides of the jaws, whereas in *Microstomus* they are fewer in number, and are nearly confined to the blind side.

Genus **Microstomus** Gottsche.

Veraequa Jordan and Starks, Bull. U. S. Fish. Comm., 22, 1902 (1904), p. 628; Proc. U. S. Nat. Mus., 31, 1906 (1907), p. 210.

Veraequa achne Jordan and Starks is so closely related to *Microstomus stelleri* that the two species are now regarded as congeneric. *Microstomus achne* differs from *Microstomus stelleri* in the narrower interorbital, and perhaps in the more slender form, and in the slightly smaller scales, and in the somewhat fewer fin-rays.

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[1] Hubbs, *l.c.*, p. 490.

III. The Species of Hippoglssoides.

A.—Introduction.

In a recent report on flounders and soles from Japan, the writer[1] described a new species of *Hippoglossoides* (*H. propinquus*), and described or discussed the species of the genus previously recognized. Schmidt[2] has since published an account of the Pacific species of *Hippoglossoides*, reducing them to the rank of subspecies. In a number of cases our conclusions were at variance. A subsequent review of the species has resulted in the following account of the classification, status, and nomenclature of these flounders.

B.—The Subgeneric Distinction of the Atlantic and Pacific Species.

The most important result of Schmidt's work probably lies in his discovery of certain differences which separate the Atlantic species consistently from those found in the Pacific. He separates the two groups as follows:

"I. Brancheostegal rays 8. Lateral line single, nearly straight. The contours of the dorsal and anal fins in the posterior half convex (Atlantic Ocean)....*H. platessoides* Fabr.

"II. Brancheostegal rays 7. Lateral line single, slightly rising anteriorly, or forming a very low arch. The contours of the dorsal and anal fins in the posterior half concave (Pacific Ocean)....*H. ellassodon,* Jord. and Gilb."

These statements have been verified in *H. platessoides* and in four of the Pacific species: *H. elassodon, dubius, hamiltoni,* and *propinquus.*

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1) Hubbs, Proc. U. S. Nat. Mus., 48, Mar. 20, 1915, pp. 466–471, pl. 26, fig. 5.

2) Schmidt, Ann. Mag. Nat. Hist., 16, Oct. 1915, pp. 299–308 (with complete synonomies, apparently published before the receipt of the paper by Hubbs).

In two instances however, a certain qualification must be made. In a small specimen of *platessoides*, 63 mm. long from tip of snout to base of caudal,[1] the margin of the dorsal fin is slightly concave posteriorly, but it is convex in the adult. The lateral line in the Pacific species usually forms a well-marked curve anteriorly,[2] but in *H. elassodon* is only a little more curved than in *platessoides*. Other differences further serve to distinguish the two groups: the Pacific species have stronger premaxillary teeth than those from the Atlantic, and they lack the dark spots, so characteristic of their Atlantic representatives.

The species of the two oceans should apparently be separated as distinct groups, which are provisionally regarded as subgenera. The Atlantic forms retain the name *Hippoglossoides* Gottsche, 1835, while *Cynopsetta* is available for the Pacific species. This name was proposed by Schmidt (in 1904) as a genus for *C. dubia* to distinguish that species from *elassodon*, primarily on account of the stronger dentition. This character, however, is only of specific value, as Schmidt has since recognized.

C.—List of the Subgenera and Species of Hippoglossoides.

Subgenus *Hippoglossoides*.
    H. platessoides (Fabricius).[3]
    H. limandoides (Bloch).
Subgenus *Cynopsetta*.
    H. elassodon Jordan and Gilbert.[4]

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1) From long. 10° E., lat. 72° 20′ N.

2) This character is quite variable in *H. dubius*.

3) The form from Greenland and the east coast of North America is probably distinct from the European species *H. limandoides* (see Smitt, Hist. Scandin. Fishes, 1, 1893, p. 421, pl. 17, fig. 3).

Both of the specimens in the collections of Stanford University have 11 pectoral rays, corresponding with Smitt's figures for *platessoides*. One of these is from Massachusetts; the other, from long. 10° E., lat. 79° 20′ N.

4) Dorsal, 75 and 80; anal, 59 and 60; in two specimens from *Albatross* station 3642, Avatcha Bay, Kamchatka.

H. dubius Schmidt.
H. robustus Gill and Townsend.
H. hamiltoni Jordan and Gilbert.
H. propinquus Hubbs.

D.—Status of the Species of the Subgenus Cynopsetta.

Four of the species of *Cynopsetta : elassodon, dubius, hamiltoni*, and *propinquus* have already been examined and compared by the writer (*l. c.*). These species were found to be quite distinct from one another. Comparisons of descriptions of the fifth known species, *H. robustus*, with specimens of both *hamiltoni* and *propinquus*, seemed to indicate that *robustus*, with its deeper body, etc., was distinct. The measurements presented by Schmidt indicate clearly that the specimens which he identified as *Hippoglossoides elassodon robustus* have more slender bodies than the types of *robustus*, and that they have shorter fin-rays especially in the pectorial fin, than in *hamiltoni*. It is probable that Schmidt's form is identical with neither *robustus* nor *hamiltoni*, as he urged. In both of the characters just mentioned it agrees with *H. propinquus*.

Schmidt refers *Hippoglossoides katakuræ* Snyder to *H. elassodon*. As the writer has previously indicated (*l. c.*, p. 466), *H. katakuræ* is a synonym of *H. dubius ;* the type has 12 gill-rakers on the lower limb of the outer arch ; *dubius* has 13—15 (rarely 12, or even 11 or 17) ; *elassodon* has 15 – 19.

Hippoglossoides dubius cannot be an age-variant of *elassodon*, as Schmidt suggested, because of the numerous differences evident in both young and adult, as previously described by the writer.

E.—The Relationship of the Species of the Subgenus Cynopsetta.

Schmidt has referred all the Pacific species of *Hippoglossoides* to *H. elassodon*, recognizing three subspecies : *H. e. dubius, H. e. elassodon,* and *H. e. robustus*. The application of trinominal nomenclature to these fishes seems wholly unwarranted, at least at present. Such a usage would indicate that there is but one species of *Hippoglossoides* in the Pacific, with characters not constantly different in the three forms. According to the current conception of subspecies, it would be further necessary to assume that these three forms have different distribution, and that they intergrade in the area where their ranges interlap. No such intergradation has been demonstrated. In two provinces three species live together, as indicated in the following table.

Table to Show the Distribution of the Species of the Subgenus Cynopsetta.

	West cost of U. S. A.	Bering Sea.	Kamchatka	Northern Japan
H. elassodon	×	×	×	—
H. dubius	—	—	—	×
H. robustus	—	×	—	—
H. propinquus	—	—	×	×
H. hamiltoni	—	—	×	×

The Kamchatkan record of *propinquus* is added on the assumption that *H. e. robustus* Schmidt is the same.

The suggestion of Schmidt that the form which he names *H. elassodon robustus* is the northern representative of *H. e. elassodon* and of *H. e. dubius* can not be confirmed: on one hand, because *elassodon* also occurs in Kamchatka and Bering Sea; on the other hand, because *propinquus*, to which *H. e. robustus* Schmidt should probably be referred, was dredged by the *Albatross* in Aniwa Bay, together with *H. dubius*.

So far as known, *H. dubius* is confined to the fauna of northern Japan,[1] and appears there to represent[2] *H. elassodon* of the Kamchatkan

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1) Additional records to those already given are *Albatross* stations 5003 and 5011.

2) Schmidt has recorded both species from the Gulf of Tartary.

and Bering Sea faunas, just as *Hippoglossus stenolepis*, *Liopsetta pinnifasciata*, and *Lepidopsetta mochigarei* represent their more northern representative species *H. hippoglossus*, *L. glacialis*, and *L. bilineata*.[1]

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[1] The northern subspecies or species should probably be called either *umbrosa* or *perarcuratus*.